10.0 Quality Control Plan

10.1 Introduction

10.1.1 Policy Statement

This QCP has been developed to comply with appropriate industry and regulatory standards. It will be used to ensure that project-related activities are conducted in a planned and controlled manner, that the product of those activities conforms to contractual requirements, and that appropriate documentation exists to support each activity for which EEG is responsible.

10.1.2 Scope

This QCP consists of the plans, procedures, and organization necessary to produce an end product that meets the requirements specified in CEHNC Contract W912DY-05-D-0007 and the SOW addressing the non-time-critical removal action at the former naval target range on Culebra Island and its surrounding cays. This plan includes a designated QC organization with the authority to enforce all provisions. The plan governs all operations by EEG and its subcontractors, both on and off site. It covers submittals, field activity control, field changes, equipment standardization and maintenance, audits, deficiencies and non-compliance, corrective actions, and associated documentation and recordkeeping. The QCP is designed to follow the sequence of field operations.

10.1.3 Quality Assurance

10.1.3.01 QA will be performed by personnel listed in the project Quality Assurance Surveillance Plan.

10.1.3.02 The government will perform QA on all aspects of this task order. Any portion that fails QA will be redone at no cost to the government.

10.2 Site-Specific Quality Control Plan

This QCP describes the quality management procedures to be followed during the removal action of MEC at selective areas at Culebra Island, Puerto Rico, and the surrounding cays. Site-specific information includes but is not limited to project personnel, definable features of work, required

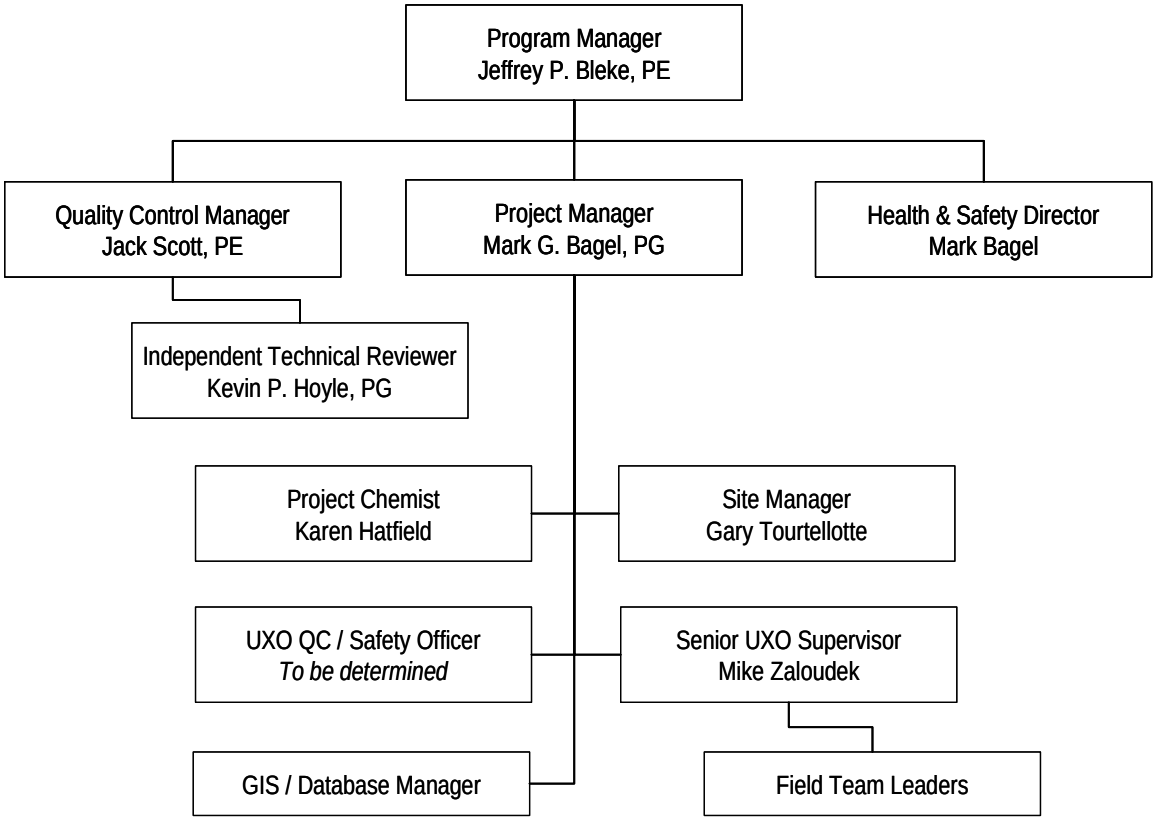
control operations, equipment tests, specific equipment calibration and response check procedures, audit procedures, and USACE or regulatory agency requirements.

10.3 Quality Control Organization

10.3.01 EEG QC personnel will not be replaced without the approval of CEHNC. The project manager will provide CEHNC with the names, qualifications, duties, and responsibilities of each proposed replacement.

10.3.02 **Figure 10-1** presents an organization chart showing the lines of authority for implementation of the project, and the text following describes the job requirements, responsibilities, duties, and authorities of key QC personnel.

Figure 10-1. Quality Control Organization Chart



10.3.1 Responsibilities and Authority

10.3.1.1 Program Manager

The program manager is Jeffrey P. Bleke. He is responsible for overall direction, coordination, technical consistency, and review of contract activities. Responsibilities and authorities include:

- Final approval and review of work plans, project deliverables, schedules, contract changes, and labor allocations
- Ensuring availability of personnel assigned to the project for the duration of the contract
- Performing quarterly project status reviews to assess compliance with scope, budget, and schedule
- Communicating, as necessary, with CEHNC to evaluate the progress of the program and to facilitate the avoidance of any potential problems

10.3.1.2 Quality Control Manager

EEG's QC manager, Jack Scott, will perform his duties independent of any cost, scheduling, and other performance constraints. These issues are the responsibility of the program manager or the project manager. The QC manager or his representative is considered to be essential personnel and authorized to be on site during clearance operations. The QC manager will be responsible for reviewing and updating the QCP as needed, and for verifying compliance with the plan. Compliance will be verified through audits of project activities conducted by the QC manager or his representative, who has the authority to require corrective actions and stop work (work stoppage will be coordinated with CEHNC), as needed, to ensure compliance with the SOW. Responsibilities will include:

- Ensuring that the site QCP is being properly implemented
- Ensuring that corrective actions are documented and acknowledged by the project manager and field personnel, as well as communicated to the customer, when adverse situations or defective work result from a project activity
- Ensuring that all personnel are properly trained and adequately experienced for the duties assigned
- Ensuring that project deliverables are defined before beginning the field work and submitted as required by the Work Plan and project schedule
- Evaluating the implementation and effectiveness of the QCP on a regular basis
- Ensuring that ground-truthing and feedback processes are being accomplished

- Implementing field investigation QC activities, including field management of ground reconnaissance activities and environmental protection programs
- Scheduling to ensure that the QC personnel are on site during all field activities
- Delegating QC duties to qualified staff members (QC staff will report to and be supervised by the QC manager)

10.3.1.3 Health and Safety Director

EEG's health and safety director, Mark Bagel, will be responsible for implementing the corporate health and safety program, reviewing and monitoring compliance with project-specific health and safety plans, implementing corrective measures for health and safety deficiencies, and ensuring required training and medical monitoring of personnel. The health and safety director has the authority to require corrective measures related to health and safety issues and to stop work, if required, to ensure a safe working environment. Responsibilities include:

- Investigating all injuries and illnesses
- Assisting in the development of corrective action plans
- Implementing corrective action plans to eliminate or mitigate hazards

10.3.1.4 Project Manager

The project manager, Mark Bagel, has the responsibility and authority for day-to-day management of all operations and has the authority to stop any phase of work deemed necessary to achieve a safe work environment and good quality work. Responsibilities include:

- Review and approval of sampling, testing, field investigation methods, and QC, including designs, schedules, and labor allocations
- Preparation of progress reports with the assistance of key support personnel
- Management of funds for labor and materials procurement
- Technical review of all project deliverables
- Establishment and enforcement of work element milestones to ensure timely completion of project objectives
- Implementation of corrective action in response to Non-Conformance Reports
- Response to Non-Conformance Reports within 30 days, or as stipulated in the audit report
- Frequent communication with CEHNC regarding day-to-day progress of the project

10.3.1.5 Independent Technical Reviewer

The independent technical reviewer, Kevin Hoyle, PG, will:

- Review each designated contract deliverable
- Provide comments on all deficiencies
- Review comments and responses
- Sign certification form indicating document completion

10.3.1.6 Project Chemist

The project chemist, Karen Hatfield, will be responsible for:

- Implementing the field QC plan
- Performing as single point of contact for all chemical quality discussions
- Working with project QC manager or his representative to ensure the quality of the field data
- Interfacing with the subcontractor analytical laboratories and receiving notification of sample receipts from the analytical laboratories
- Working with the project team in reporting deficiencies and ensuring that corrective actions have been implemented

10.3.1.7 Site Manager

The field site manager, Gary Tourtellotte, is responsible for the daily conduct of all operations at the project site. He has the authority to stop any phase of work deemed necessary to achieve a safe work environment and good quality work. The duties of the site manager will include:

- Daily work assignments
- Personnel and resource assignments
- Monitoring and tracking the progress of each operable phase of work
- Reviewing QC documentation
- Reporting daily progress to the project manager
- Providing weekly report data to the project manager
- Conducting weekly project meetings, and coordinating with project safety and quality management personnel
- Interfacing with the customer, site visitors, and off-site EEG personnel

10.3.1.8 UXO Quality Control / Safety Officer

10.3.1.8.01 One individual (to be determined) will act as both the UXO QC officer and the UXO safety officer (UXOQC/SO) on this project.

10.3.1.8.02 In his capacity as the UXO safety officer, the UXOQC/SO is responsible for performing the routine duties for health and safety functions, with the assistance of the health and safety director. He will administer the Site-Specific Health and Safety Plan and addenda. Responsibilities include:

- Conducting daily safety briefings
- Performing regular and frequent site inspections to find hazards and observe personnel at work
- Stopping work when necessary to prevent injury or illness
- Ensuring personnel and environmental health and safety
- Investigating all injuries and illnesses
- Developing and implementing corrective action plans to eliminate or mitigate hazards

10.3.1.8.03 In his capacity as the UXO QC specialist, he reports directly to the QC manager in the performance of his duties, is the senior QC staff member on site, and is responsible for the implementation and enforcement of the QCP. Responsibilities include:

- Verifying site training and current hazardous waste operations and emergency response (HAZWOPER) and medical monitoring documentation
- Ensuring that all site surveillance activities and audits are conducted and documented in accordance with the QCP
- Ensuring all QC reports are provided in the proper format, as required by the QCP
- Authorizing corrective actions as required to ensure that all work complies with the QCP and stipulated contractual requirements
- Ensuring that MEC-related materials have been completely removed from the site
- Reviewing and verifying correct ID for all recovered MEC and munitions debris
- Checking for defective or damaged equipment
- Verifying that appropriate personnel are being used during all field operations
- Performing and documenting daily audits or surveillances of job activities
- Performing follow-up checks and correction of all deficiencies prior to the start of additional features of work

- Verifying that all required equipment calibration has been performed and that inspection and standardization results comply with contract requirements and the Work Plan
- Maintaining all audit and surveillance documentation

10.3.1.9 GIS / Database Manager

Duties and responsibilities will include:

- Ensuring that the database is designed and established prior to commencement of field investigations
- Ensuring that data for each activity is properly incorporated into the project GIS
- Ensuring that metadata is accurately maintained in accordance with the Work Plan

10.3.1.10 Senior UXO Supervisor

Duties and responsibilities will include:

- Conducting and supervising equipment maintenance and function checks
- Supervising intrusive investigations
- Ensuring safety during all MEC removal operations
- Ensuring that all personnel are properly trained
- Ensuring that all field logs for MEC removal operations are updated daily
- Ensuring safe, compliant transportation of explosives
- Ensuring that explosives management activities are conducted in accordance with the Work Plan and governing regulations
- Ensuring that site-preparation activities are completed in accordance with the project Work Plan
- Ensuring that MEC removal operations are conducted in conformance with the project Work Plan

10.3.1.11 Field Team Leaders

Team leaders are responsible for the conduct of the field work assigned and for direct supervision of team members. Duties will include:

- Performing QC checks
- Documenting field activities in daily logs
- Supervising field operations

- Participating in project meetings
- Adhering to all safety and quality requirements in accordance with the Work Plan

10.3.2 Qualifications and Training

10.3.2.01 EEG maintains personnel files for each employee. These records include copies of licenses, training records, and certificates of qualifications that support employees' placement and position. Prior to an employee's initial assignment or any change in duties/assignments, the project manager reviews the employee's licenses, training records, and certificates to ensure that the employee is qualified. EEG will ensure that the UXO-qualified personnel meet standards required by CEHNC and will submit a letter request with resumés and UXO number from the UXO database to CEHNC for approval prior to mobilizing to the site.

10.3.2.02 A file on all UXO personnel will be maintained to include EOD certification, current medical monitoring physical, 40-hour HAZWOPER safety training certification, 8-hour HAZWOPER supervisor certification, and current annual refresher training as required by this Work Plan. Prior to the start of field activities, EEG will also submit to CEHNC the resumés for EEG's field personnel that were not included in Appendix H of this Work Plan.

10.3.2.03 All other training and health records for field personnel will be maintained on site, including 40-hour OSHA health and safety training certificates, 8-hour supervisor training records, 8-hour annual refresher course, certificate of medical clearance and annual physical examination, current certificate for cardiopulmonary resuscitation (CPR) training and first aid, and other applicable certifications.

10.3.2.04 Specific training for field equipment, including GPS and geophysical operations and procedures, will be provided to all personnel during the initial safety briefing and site-specific training. Training is conducted by the UXOQC/SO, the project manager, and the SUXOS. Attendance records (and student performance when applicable) are maintained. Prior to assignment to a duty position or change in duty position, the UXO technician assigned QC duties performs a check of the individual's site personnel record to ensure that the employee is qualified to fill the position.

10.4 Quality Management System

10.4.1 Deliverables

10.4.1.01 The Work Plan and reports will be developed by the project manager and reviewed by the EEG program manager prior to submittal to CEHNC. Funding- and budget-related items will be developed by the EEG project manager and reviewed by the EEG program manager prior to submittal to CEHNC. Data collection and assemblage for task-specific reporting requirements will be conducted by the site manager. Site data will be reviewed and finalized by the project manager prior to submittal to CEHNC in weekly and monthly reports. Final reports will be prepared by the project manager and reviewed by the EEG program manager prior to submittal to CEHNC.

10.4.1.02 Any contractual changes or change requests will be prepared by the project manager and reviewed and submitted by the EEG program manager.

10.4.2 Field Activities

As stated in Subchapter 10.3.1.8, the EEG UXOQC/SO will perform daily inspection and surveillance of all work areas to maintain control over field activities identified in the Work Plan. The controls will ensure that qualified personnel and approved procedures and equipment are used, and that specified process parameters and environmental conditions are maintained. Also, the controls will ensure that all requirements of the contract are met. **Table 10-1** provides a list of controls to ensure that proper equipment and procedures are being used, specific parameters monitored, and how they will be maintained.

Table 10-1. Quality Control Checks, Parameters, and Corrective Actions

Measured Item	Controls Used	Parameter Measured	Corrective Action
Work attire (PPE)	UXOQC/SO inspects to ensure that proper PPE is being worn and that PPE is in good condition, meeting the requirements of EM-385-1-1 and OSHA standards.	Accepted / rejected	Equipment shall be maintained by the field personnel and will either be accepted or rejected. Rejected PPE will be tagged and removed from operation after concurrence by SUXOS.

Measured Item	Controls Used	Parameter Measured	Corrective Action
Equipment operation	UXOQC/SO will verify that instrument checks are being conducted at least three times a day. UXOQC/SO will randomly affix inert target items beneath a blanket in such a manner as to conceal the number and types of items during the test. Operator will perform equipment balancing, then locate the items under the blanket.	Frequency and accuracy of measurement (pass / fail)	Equipment shall be maintained by the field personnel and will either be accepted or rejected. Rejected sensors will be tagged as non-operable and removed from the site after concurrence by SUXOS.
	UXOQC/SO will verify that the operator is able to consistently maintain a height of operation and ability of the equipment to detect target items.	Height must be equal to or less than the determined height. Operator must be able to easily locate the items buried at the site.	Equipment shall be maintained by the field personnel and will either be accepted or rejected. Rejected PPE will be tagged and either repaired or thrown out after concurrence by site manager.
Vehicle	General-use vehicles will be inspected daily by UXOQC/SO to ensure that they are safe.	Complete parameters in the Daily Vehicle Inspection Form	Daily-use vehicles will be maintained by the field team and will be inspected by UXOQC/SO. The results of the inspection will be reviewed by site manager. If there are deficiencies in the equipment, EEG site manager will notify CEHNC site representative for concurrence whether the equipment should be used or removed from the site.
	Vehicles used for transport of explosives will be inspected prior to use by UXOQC/SO to ensure that they are safe.	Review parameters located on the Vehicle Inspection Form (Transport of Hazardous Material)	Vehicles used for transport of explosives will be maintained by the field team and/or the supplier. These vehicles will be inspected by UXOQC/SO. The results of the inspection will be reviewed by SUXOS. If there are deficiencies in the equipment, EEG site manager will notify CEHNC site representative for concurrence whether the equipment should be used or removed from the site.
Brush-cutting equipment	All brush-cutting equipment will be inspected daily by the UXOQC/SO to ensure that the equipment is operating and safe for use.	Each piece of equipment will be checked to ensure that it can be safely operated, that all safety guards are in place, that proper PPE is used, and that the blades are not chipped or cracked and are in sharp condition. If these parameters are found to be acceptable, UXOQC/SO will complete the appropriate box on the Quality Management System Checklist.	Equipment shall be maintained by the field personnel and will either be accepted or rejected. Rejected equipment will be tagged as non-operable and removed from the site after concurrence by SUXOS.

Measured Item	Controls Used	Parameter Measured	Corrective Action
Emergency equipment, first aid kit, burn kit, fire extinguisher	UXOQC/SO will inspect to ensure that the equipment is on site and in the appropriate locations (i.e., magazine compound, vehicles, office, etc.), that it is in good condition, and that it meets the contract requirements.	UXOQC/SO will denote that the conditions and the quantities of safety equipment are acceptable on the safety inspection checklist.	Equipment will be maintained by the field personnel and will be either accepted or rejected. Rejected equipment will be tagged as non-operable and removed from the site after concurrence by SUXOS.
Grid layout	UXOQC/SO will inspect to ensure that the appropriate grid or subgrid corners are located and that sweep lanes are being set up in a proper manner.	UXOQC/SO will inspect the grid or subgrid layout operation and the setup of the grid lanes. The Quality Management System Checklist will be completed with his findings.	The layout of the grids or subgrids will be either accepted or rejected. If the width of the grid lanes is less than or equal to 4 feet, the work will be acceptable. If the distance is greater than 4 feet, UXOQC/SO will ask the team leader to reset the lanes and redo the search already conducted.
Search techniques	UXOQC/SO will observe the search techniques. The search techniques must be accomplished in a manner that all target items identified in Table 6-1, Step 6, are located. Hazardous items found that are smaller will also be removed.	UXOQC/SO will check that proper techniques are being used; that the speed of the operation is such that the target items will be checked to ensure sensor head speed is sufficient to locate MEC items, sweeping at the appropriate height; and that the sweep coverage is complete under trees and shrubs. He also ensures that all surface items are immediately identified and that partially penetrating items are being flagged and excavated, and that all MEC items are properly flagged and located for GPS data collection. Acceptance of these procedures will be noted in the daily Quality Management System Checklist.	If improper search techniques are being employed, UXOQC/SO will discuss the deficiencies with SUXOS and will get concurrence for the proper corrective action. He will re-inspect the operation to ensure that the corrective action is being applied.
	UXOQC/SO will randomly seed areas of the grid(s) or subgrid(s) with no more than 10 concealed, inert target items to be detected as a test of equipment and operation of the equipment. The number of items will be randomly chosen. Seed items will consist of 6-inch iron nail spikes painted blue for easy identification.	Each team must be able to find and identify all inert target items seeded within a grid or subgrid. The team leader will record the lane number, the operator number, and the item found.	If teams fail to detect and identify one item among those seeded in a grid or subgrid, a root cause analysis will be performed.

Measured Item	Controls Used	Parameter Measured	Corrective Action
Search techniques (continued)	UXOQC/SO will perform field-level QC checks by lanes or groups of lanes with the purpose of identifying missed items of concern.	If MEC is found, a QC failure is logged. If an anomalous item (a piece of metal smaller than the QC/QA failure threshold) is found and was not positively identified during the initial sweep, the corrective action in the adjoining column will be initiated, and the anomaly will be logged on the QC grid log along with the location, the operator, the action taken, and the percent swept.	If one anomalous item is found, UXOQC/SO will evaluate the failure and the equipment will be rechecked and its operation evaluated. If 5 anomalous items are found, EEG will resurvey 10 percent of the grid or subgrid, or lane groups within that grid or subgrid, at the operator level. If more than 5 anomalous items are found, EEG will resurvey 25 percent of the grid or subgrid, or lane groups within that grid or subgrid, at the operator level. If 10 anomalous items are found, EEG will resurvey the entire grid or subgrid, or all lane groups for that operator within that grid or subgrid.
Grubbing equipment	UXOQC/SO will ensure that grubbing equipment is operated safely and that operators are grubbing to the level required to ensure full coverage of the area with the sensors.	UXOQC/SO will inspect to ensure compliance with the safety plan and EM-385-1-1. The acceptance of these procedures will be noted in the daily Quality Management System Checklist.	If improper grubbing techniques are being employed, UXOQC/SO will discuss the deficiencies with team leader and SUXOS and will get concurrence for the proper corrective action. He will re-inspect the operation to ensure that the corrective action is being applied.
Tamping and demolition shot	UXOQC/SO will ensure the proper setup of tamping and demolition shot operations and will ensure that all safety protocols have been met as described in Chapters 2 through 4 of this Work Plan.	UXOQC/SO will inspect to ensure compliance with this Work Plan. The acceptance of these procedures will be noted in the daily Quality Management System Checklist.	If improper tamping and demolition operation techniques are being employed, UXOQC/SO will discuss the deficiencies with team leader and SUXOS and will get concurrence for the proper corrective action. He will re-inspect the operation to ensure that the corrective action is being applied.
Team leaders' daily paperwork	UXOQC/SO will inspect the completion of paperwork from the field team leaders.	The work conducted by the field team leader will be documented in a time log. Team leaders will also complete Equipment Operational Check Logs, Demolition Shot Logs, Explosives Consumption Certificates, Grid Sweep Logs, and Surface Soil Sampling Forms. UXOQC/SO will inspect these documents and ensure that they are completely filled out and that the information is correct. The acceptance of these forms will be noted in the daily Quality Management System Checklist.	UXOQC/SO and/or SUXOS will inspect these forms on a daily basis. If these forms are found incomplete, the team leader will be asked to redo the forms. Site manager will inspect the Surface Soil Sampling Forms.
Office paperwork	UXOQC/SO will inspect the completion of paperwork from SUXOS.	SUXOS will prepare a time log of activities occurring during the day, Daily Operations Log, Debris Inventory Log, Explosives Accountability Log, and MEC Accountability Log.	UXOQC/SO will inspect these forms on a daily basis. If these forms are found to be incomplete, SUXOS will be asked to redo the forms.

Measured Item	Controls Used	Parameter Measured	Corrective Action
Office paperwork (continued)	UXOQC/SO will inspect the completion of paperwork from site manager.	Site manager will be responsible for keeping a time log for his activities. He will conduct database entry, assist the UXOQC/SO with the completion of the daily QC log, complete the Chemical Quality Control Report, and review Surface Soil Sampling Forms. Site manager will also check daily to see if the UXOQC/SO has completed the proper forms and he will assist the UXOQC/SO as needed in the completion of his forms.	UXOQC/SO will inspect these forms on a daily basis. If these forms are found incomplete, site manager will be asked to redo the forms.
Mapping and UXO data	UXOQC/SO will inspect the location of the control point and ensure proper setup of the GPS. Appropriate consideration will be given to satellite coverage and the stable positioning of the device on a tripod.	SUXOS will ensure that the base station, if used, is placed over the control point and that the height of instrument is documented; that the data collection rate is 10 seconds; that the batteries are charged; and that the instrument is in proper working condition. He will assign responsibility of the GPS setup to a team member who will be responsible for ensuring that the equipment is operating properly and that it is fully charged. UXOQC/SO will ensure that the Rover is properly set up and that it is coordinated with the base during data collection operations. He will also ensure that a minimum of 5 minutes of data collection is performed over each MEC location.	UXOQC/SO will inspect the setup on a daily basis. If the setup is found to be improper, the data must be re-collected. If the data cannot be re-collected, a non-conformance memorandum will be issued.
	Site manager will download and inspect the data collected.	Site manager will check to ensure that the data collected is correctly and that the location IDs for soil samples, MEC locations, and demolition locations match the descriptions and location IDs provided in the database.	Site manager will download and inspect the GPS data collected and ensure that the process has been completed properly each day data is collected. If the data is incomplete or does not meet the accuracy requirements, site manager will contact the project manager to determine what corrective action is necessary.
	Project manager will receive and review a weekly download of all data collected.	Project manager will verify that all data collected will meet all data goals identified in Chapter 7 of this Work Plan.	If the data is not completed properly, project manager will notify CEHNC project manager and the corrective action process will be initiated.

Measured Item	Controls Used	Parameter Measured	Corrective Action
Soil sampling and analysis	Site manager will inspect all documentation of soil samples collected.	Site manager will ensure that the data is correct, that the soil sampling forms are properly completed, that the condition of the samples is acceptable, that the chains of custody are completed, and that the samples are properly packed prior to sampling. UXOQC/SO will ensure that the samples are collected as per the Field Sampling and Analysis Plan.	If the sampling procedures are incorrect, the corrective action will be initiated. The non-compliance will be issued and the corrective action will be undertaken as provided in the Field Sampling and Analysis Plan.

10.4.2.1 Pre-Mobilization Quality Control Process

Prior to mobilization, the EEG project manager will conduct a preliminary readiness review to assess the completion status of a punch list of items that could delay mobilization. A final readiness review will be conducted when the project preparation team reports that all items on the punch list have been executed. The final readiness review will also act as a preparatory phase meeting to discuss the schedule and expectations with the client, subcontractors, and key personnel.

10.4.2.2 Initial and Interim Field Inspections

10.4.2.2.01 An initial inspection will be conducted of equipment, supplies, and site conditions prior to the start of the project. Video and digital pictures will be taken of the inspected items to ensure that claims will not be made on these items.

10.4.2.2.02 The EEG QC manager or his/her representative will perform periodic inspections of job site activities. Appropriate technical assistance will be provided to perform the inspections, as necessary, for the specific field investigation activities being performed.

10.4.2.2.03 Prior to mobilization, the EEG UXOQC/SO will verify the following:

- Inspect the quality of workmanship
- Verify compliance with contract requirements
- Compliance with approved required submittals
- Verification that all required equipment calibration and response checks have been performed and that results comply with contract requirements and the Work Plan
- Check for defective or damaged equipment

- Verification, inspection, and documentation of delivery and storage of material and equipment to the site
- Performance of follow-up checks and correction of all deficiencies prior to the start of additional features of work that may be affected by the deficient work (EEG will not conduct field operations using non-conforming investigative work methods)

10.4.2.3 Final Inspection

10.4.2.3.01 At the completion of all field work or any defined increment of the field work, the UXOQC/SO manager or his representative will conduct a completion inspection with the CEHNC representative of the work and develop a punch list of any issues that need to be addressed. After the punch list is completed EEG will address all issues on the punch list to ensure all remaining issues have been resolved. A final inspection will be conducted with the CEHNC representative prior to demobilization to ensure compliance issues have been met. Prior to demobilization, the EEG UXOQC/SO will inspect the site to:

- Ensure that all demolition and excavation areas are repaired to a reasonable state
- Verify that all government-furnished equipment purchased during this project has been sent to its final destination
- Ensure proper shipment and storage of documents produced during the field effort
- Inspect the sites with the client representative to ensure there are no remaining punch list items that have not been addressed

10.4.2.3.02 The punch list will be included in the QC documentation that will also include the estimated date by which the deficiencies were corrected.

10.4.3 Documentation

10.4.3.01 All inspection documentation will be maintained in the project files and will include:

- Quality Management System Checklist and Quality Control Reports (forms included in Appendix F)
- All equipment calibration and response and equipment maintenance results
- QC-related meeting minutes
- All non-conformance and corrective action documents as well as audit documentation

10.4.3.02 These documents will include the following information:

- EEG personnel and their areas of responsibility, qualifications, and project-specific training
- Weather conditions
- Operating equipment, with hours worked, idle, or down for repair
- Work performed each day, including location, description, and personnel performing the work
- Test and/or control activities performed with results and references to contract requirements (deficiencies will be noted along with corrective action)
- Quantity of materials received at the site with statement as to acceptability, storage, and reference to contract requirements
- Submittals reviewed, with contract reference, reviewer's name, and action taken
- Job safety evaluations stating what was checked, results, and instructions or corrective actions
- Instructions given or received and conflicts (if any) with contract requirements
- Chemical Quality Control Reports of sampling activities

10.4.3.03 The Quality Control Report will be the primary document, with all other applicable reports and forms attached to it. The QC Report will be submitted to the CEHNC and CESAJ-DP-S project managers weekly. Reports will be signed and dated by the UXOQC/SO. The report from the UXOQC/SO will also include copies of any reports prepared by subordinate QC personnel.

10.4.4 Surveillance and Monitoring

Surveillances will be performed for the definable features of work. These will help to ensure that quality controls have been properly implemented in accordance with the Work Plan. Elements to be monitored are presented on the Quality Management System Checklist, which is provided in Appendix F. The areas to be monitored will include:

- Site management
- Survey and location mapping
- Geophysical detection and mapping
- MEC removal operations

- MEC disposal
- Documentation

10.5 Equipment Maintenance and Response Checks

10.5.01 All tools, instruments, and equipment deployed to the project site will be properly maintained and calibrated (as necessary) in accordance with the instrument manufacturers' specifications or standard industry practice. This applies to equipment used in the field for UXO safety support and related activities affecting quality, including geophysical instruments, communications equipment, vehicles and machinery, environmental monitoring equipment, and PPE. Rulers, tape measures, levels, and other such devices need not be standardized if normal commercial equipment provides adequate accuracy but will be maintained in good working condition.

10.5.02 Equipment will be protected from dust and contamination and visually checked for damage prior to use. Preventive maintenance on the trimmers will be performed on a regular basis according to the manufacturers' operating instructions or recommendations. Critical spare parts will be kept on hand to minimize downtime.

10.5.03 All electromagnetic detectors and GPS units will be checked daily for operational function against a known (standard) source to ensure that quality standards are maintained. An Equipment Operational Check Log (included in Appendix F) will be used to document these checks. The records will indicate the time and date of the check, the item name, and the item's serial number or ID number. Each completed weekly log will be dated and signed.

10.5.1 Electromagnetic Detectors

All electromagnetic detectors will be checked daily against a known metallic anomaly sources. The procedure to be used is presented in Chapter 6 of this Work Plan. Detectors that fail to detect the simulators or metallic sources in the field will be considered to have failed QC and will be removed from service until repaired or recharged.

10.5.2 GPS Units

The Trimble Pro XR GPS receivers used for navigation purposes and recording data will be checked daily over a known control point. Each unit will be checked for adequate battery voltage, correct configuration, and receipt of sufficient data to compute three-dimensional positions. The

GPS units must provide ±1-foot accuracy. If this is not attainable, then the data will be post-processed using a base unit or by correction through a satellite correction service.

10.5.3 Radios and Cellular Telephones

10.5.3.01 At the beginning of each work day and before departure from the field office, each radio and cellular telephone will be checked to ensure that it is operating properly. A radio check will be performed by contacting the office base station or the handheld radio of the SUXOS or UXOQC/SO. Cellular telephones will be checked by placing a call to one of the field office land lines.

10.5.3.02 The UXOQC/SO will perform random communication checks with each team to ensure that proper communications are maintained. Proper operation of cellular telephones will be verified by reading the built-in digital display that indicates that the user is in a service area.

10.5.3.03 Maintenance will include cleaning the equipment and turning it off before inserting into the battery charger. Maintenance will be the responsibility of the individual to whom the equipment is signed out.

10.5.3.04 Documentation of the status of communications equipment will be recorded on the Quality Control Report (provided in Appendix F). Each form will be typed or clearly filled out in black ink, and the data entered into the on-site database. Each document will become part of the official site record. Site personnel will keep a record of all substantive telephone conversations related to the performance of the project. Substantive telephone calls are defined as all calls to or from government personnel that require action by either the government or EEG or that directly or indirectly affect contract terms and conditions; all calls to or from federal, state, or local regulatory agency personnel; and all calls to contractor personnel that require the calling party to be referred to the Antilles Region Public Affairs Office.

10.5.4 Vehicles and Associated Equipment

10.5.4.01 Each day, before a vehicle leaves the field office area, the vehicle's operator will perform a check of the vehicle. The check will include under-the-hood and safety equipment checks and will be documented on the Vehicle Inspection Form (see Appendix F). Under-the-hood checks will include fluid levels, belts, hoses, and checks for leaks. Safety equipment checks will include windshield wipers, fire extinguishers, first aid kits, vehicle horn and lights, and tires.

10.5.4.02 During operation, checks or maintenance will include cleaning the equipment and replenishing any expended safety equipment. After operation, checks or maintenance will include cleaning the equipment and replenishing any expended safety equipment.

10.5.5 Hand Tools and Site-Specific Items

10.5.5.01 Hand tools and site-specific items such as demolition kits will be inspected before use, or at least weekly, to ensure that they are complete and in good repair.

10.5.5.02 Items that are not normally included in the site inventory may be required on individual sites. These items may include PPE or special tools. Special tools or equipment acquired after the site is opened will be included in the site inventory.

10.6 Records Management

10.6.01 The UXOQC/SO will document in his daily QC journal, on the appropriate form, the results of his inspections of records, audits, QC checks of grids or subgrids, and the corrective action for quality defects. QC records of audits and inspections will be maintained on site and available for government inspection. The QC inspections are not a substitute for the accountability of EEG personnel in supervisory positions. The field team leaders are responsible and accountable for accomplishing and documenting operator-performed maintenance and proper operation of all equipment assigned to their UXO teams.

10.6.02 Field forms and field logbooks completed by the field team leader and UXOQC/SO will be reviewed by the SUXOS on a daily basis. The SUXOS will check to ensure that the proper MEC ID, explosives inventories, demolition data, and other documented information is consistent and accurate between each of the forms. The SUXOS will submit the documents to the site manager for review, acceptance, and filing into three-ring binders.

10.6.03 The site manager will provide daily QC reports to the EEG project manager to ensure that data will be available for the completion of the weekly status reports to the client.

10.6.04 The site manager will populate the appropriate metadata into the site GIS database. The updated database will be submitted to the EEG project manager to ensure that the database meets the GIS requirements of the contract.

10.7 Field Changes

10.7.01 Approved work plans, technical procedures, and design documents will be followed during the course of field investigation activities, except in the case of some unforeseen contingency. In such instance, the performer of the task is required to determine the best approach toward satisfactory completion of the task through the following actions.

- If warranted, stop affected activities until the project manager and/or acting QC manager evaluates the situation.
- Initiate the field change approval process.

10.7.02 Should a change in the Work Plan be required, it will be submitted to the CEHNC project manager for acceptance. Only those changes impacting budget or schedule will be submitted to the contracting officer in accordance with FAR 52.

10.7.1 Responsibilities

10.7.1.01 Any individual who recognizes the necessity for a field change is responsible for initiating appropriate field changes and completing and submitting the Field Change Request Form for review and approval by the EEG project manager, the CEHNC project manager, and the CEHNC contracting officer.

10.7.1.02 The project manager is responsible for:

- Evaluating validity and acceptability of the field change request with respect to the contract requirements
- Evaluating and documenting the effect of the field change on project costs
- Coordinating with the QC manager
- Accepting, qualifying, or rejecting the field change
- Soliciting and obtaining approval from CEHNC for any technical, budgetary, or scheduling changes to the contract prior to performance of any work affected by the proposed changes

10.7.2 Procedures

10.7.2.01 Field changes will be documented by completing the Field Change Request Form and describing the reasons for the change, the recommended disposition, cost impact, impact on

previous work, and type of change (minor, major, major project impact). The signed and dated form will be immediately provided to the EEG project manager and QC manager for review.

10.7.2.02 The EEG project manager forwards the Field Change Request Form to Huntsville CHENC for direction and approval.

10.7.2.03 Upon completion of the review and approval process, the project manager forwards the Field Change Request Form to the UXOQC/SO and the SUXOS for implementation, as follows.

- The personnel responsible for the work will implement the change.
- The UXOQC/SO will note the final disposition of the field change request (e.g., change incorporated and work completed, change rejected and work performed per original requirements) on the Field Change Request Form.
- The completed Field Change Request Form will be submitted to the project file.
- The project manager will incorporate any approved cost adjustments into the budget and schedule work breakdown structure.

10.7.3 Records

The UXOQC/SO will verify that all Field Change Request Forms are attached to all on-site copies of the Work Plan. He will also track the status of all field change requests in the Quality Control Report.

10.8 Comprehensive Site Audits

10.8.01 A comprehensive site audit is an examination and evaluation to determine whether applicable elements of the site-specific QCP and Work Plan have been performed, documented, and effectively implemented in accordance with specified requirements. Audit objectives are:

- To assess the adequacy, effectiveness, and thoroughness of the QCP and Work Plan
- To verify conformance with approved procedures, work plans, drawings, specifications, and procurement documents
- To identify quality deficiencies
- To verify correction of previously identified quality deficiencies

10.8.02 Comprehensive site audits may be performed if:

- Significant changes are made in functional areas of the QCP, such as significant reorganization or procedure revisions
- Evidence exists of a serious breakdown in the implementation of the QCP
- A systematic, independent assessment of program effectiveness is necessary
- Implementation of recommended corrective actions must be verified

10.8.1 Responsibilities

10.8.1.01 The QC manager will be responsible for:

- Implementing an audit program
- Reporting quality deficiencies to management
- Reviewing and evaluating comprehensive and daily audit reports to determine if quality deficiency trends are developing
- Auditing site work on a periodic basis and submitting Non-Conformance Reports for non-compliance
- Reporting non-compliance to the project manager and program manager

10.8.1.02 The QC manager (or his designee) will audit project-related files and activites. Re-auditing to verify implementation and satisfactory completion of recommended corrective actions will be performed as deemed necessary.

10.8.1.03 The UXOQC/SO will be on site full-time to conduct daily audits of MEC removal activities and documentation.

10.8.1.04 The program manager will review all audit reports.

10.8.2 Comprehensive Site Audit Report and Follow-Up

10.8.2.01 Following an audit, the QC manager or his representative will prepare and sign an audit report, which will include the following:

- Audit scope
- Audit date
- Auditor ID
- Controlling documents
- Personnel contacted

- Audit result summary, including an evaluation statement of elements audited
- ID of any Non-Conformance Reports
- Quality Audit Checklist for UXO Sites

10.8.2.02 The report, with attached Non-Conformance Reports, will be distributed to the project manager within 30 days of the audit. The project manager will review the audit report and any Non-Conformance Reports. If a Non-Conformance Report has been issued, the project manager will determine and schedule appropriate corrective action to prevent recurrence. The project manager will describe the corrective action taken on the Non-Conformance Report and submit the notice to the QC manager within 30 days after audit report issuance.

10.8.2.03 The QC manager will:

- Verify that the project manager completes the appropriate sections of the Non-Conformance Report and submits the form within the designated time
- Review the response and determine whether it is satisfactory
- Evaluate evidence of completion of corrective action to determine whether the action taken is satisfactory
- Request an additional response if the response and/or corrective action is unsatisfactory
- Close the Non-Conformance Report, if the response and/or corrective action is satisfactory

10.9 Non-Conformance and Corrective Action

EEG will follow non-conformance and corrective action protocols in order to:

- Verify that conditions adverse to quality (non-conformances) are identified and reported to appropriate management levels
- Verify that non-conforming items (e.g., test data, analyses) are appropriately marked and/or segregated and not used until corrective action has been completed
- Verify that appropriate corrective actions or dispositions (i.e., accept, reject, repair, rework) have been recommended, approved, and implemented
- Provide a system for the review and analysis of conditions adverse to quality (nonconformance) to determine their causes and trends, and to verify that corrective actions will preclude recurrence of adverse conditions.

10.9.1 Responsibilities

10.9.1.01 All EEG project team personnel will be responsible for identifying and reporting non-conformance.

10.9.1.02 The supervisor of the activity is responsible for:

- Evaluating non-conformances to determine if the work should be stopped
- Proposing corrective action
- Implementing corrective action
- Evaluating non-conformance impact on prior work or on previously obtained data (if any), and notifying all individuals and organizations that may be affected by the nonconformance and resulting data

10.9.1.03 The project manager and QC manager are responsible for:

- Evaluating non-conformances to determine if the work should be stopped, and/or if the non-conformance should be reported to CEHNC
- Approving the proposed corrective action or disposition
- Verifying that the corrective action or disposition has been satisfactorily implemented
- Providing (if necessary) CEHNC with a written report of any non-conformance

10.9.1.04 The QC manager is responsible for reviewing non-conformances to determine if trends adverse to quality are developing, and for proposing and implementing long-term corrective action to prevent recurrence of any identified non-conformance trends.

10.9.2 Procedure

10.9.2.1 Identification and Reporting of Non-Conformance

A non-conformance exists if there is a deviation from or non-compliance with the contract SOW and contract requirements, the QCP, approved procedures, work plans, or other project requirements. Non-conformances also include major errors in documented analysis, data, or results, and deficiencies in documentation or any other aspect of the project that affect quality. Personnel who identify a non-conformance will report the condition by:

- Completing the Problem Description section of the Non-Conformance Report (see Appendix F)

- Requesting a Non-Conformance Report number from the QC manager, who will enter the Non-Conformance Report on the log
- Distributing the Non-Conformance Report to the project manager and QC manager

10.9.2.2 Evaluation of Non-Conformance Report

10.9.2.2.01 The QC manager and project manager will review the Non-Conformance Report to determine if:

- Ongoing work should be stopped. (If work stoppage is required, work will be stopped as outlined in Subchapter 10.9.2.6.)
- The non-conformance constitutes a significant condition adverse to quality, and in such a case, will determine the cause of the condition. Examples of significant conditions adverse to quality are failures to implement the QCP, major errors in data or analyses that had previously been approved, major deviation from the contract or CEHNC-approved work plans, major deviations from the SOW, and conditions that may affect the cost or schedule of the work. Non-conformances that constitute significant conditions adverse to quality will be reported to CEHNC.
- The non-conformance has any impact on previously obtained data or reports submitted to CEHNC or other organizations. If affected, the project manager will note the impact in the Description section of the Non-Conformance Report and notify in writing all individuals and organizations that may be affected by the non-conformance and resulting data.

10.9.2.2.02 The proposed corrective action will be documented through completion of the Corrective Action section of the Non-Conformance Report.

10.9.2.3 Recommendation of Corrective Action or Disposition

Persons determining corrective action or disposition will have demonstrated competence, will have an adequate understanding of the requirement, and will have access to pertinent background information (e.g., the engineer responsible for the Work Plan). The QC manager will recommend corrective action or disposition to resolve the non-conformance. In the case of a non-conformance, the corrective action will be such as to preclude recurrence of the non-conformance. The recommended corrective action or disposition will be reviewed and approved by the project manager and the UXOQC/SO.

10.9.2.4 Corrective Action Implementation and Verification of Implementation

The approved corrective action or disposition will be implemented by appropriate personnel. When corrective action is completed, the Quality Assurance Verification section of the Non-Conformance Report will be signed and dated by the UXOQC/SO.

10.9.2.5 Client Notification and Approval History

10.9.2.5.01 A hard copy of the Non-Conformance Report will be provided to the CEHNC project manager for review upon issuance and resubmittal through the correction action and QA verification process. His response will be annotated on the Client Notification Summary Section of the Non-Conformance Report. A courtesy copy of each Non-Conformance Report will be submitted to EQB for review.

10.9.2.5.02 The approval history will be noted during each step of the implementation and review of the Non-Conformance Report. All persons concurring with the document will sign the Approval History section of the Non-Conformance Report.

10.9.2.6 Work Stoppage

10.9.2.6.01 Work stoppage authority resides with the QC manager, project manager, site manager, UXOQC/SO, and CEHNC.

10.9.2.6.02 If it is determined that work will be stopped, it will be noted in the Corrective Action section of the Non-Conformance Report; the conditions necessary for work to resume will also be noted and coordinated with CEHNC.

10.9.2.6.03 The supervisor will direct project personnel to stop all affected work. Work will not be restarted until the conditions required to restart work have been satisfied and written approval has been received from the QC manager. All work stoppages will be reported to CEHNC.

10.9.2.7 Tracking of Non-Conformance Reports

The QC manager will monitor Non-Conformance Reports to determine if trends adverse to quality are developing. If such trends are developing (e.g., repetitive Non-Conformance Reports related to a particular activity or organization), the QC manager will issue a written report identifying the problem to the project manager.

The project manager will evaluate the identified problem and propose and implement a written corrective action program to prevent recurrence of the non-conformance.

10.10 Lessons Learned

10.10.01 During the course of field activities, data or information may be discovered that could eliminate or reduce challenges and/or offer opportunities for quality and productivity improvements through value engineering. These lessons learned will be valuable tools in updating plans and procedures for subsequent field activities to include further geophysical and intrusive investigations.

10.10.02 Lessons learned will be captured and documented in the Quality Control Report prepared by the UXOQC/SO and the site manager.

10.10.1 Weekly Quality Management Debriefings

The EEG UXOQC/SO will be responsible for conducting weekly quality management debriefings. These debriefings will be held with a CEHNC safety specialist (when on site), the SUXOS, subcontractor representatives, and the team leaders (if necessary). The site manager will be included in the meetings and will prepare meeting minutes. Discussions during these meetings will include but not be limited to project status, safety issues, QC issues, lessons learned, and future schedule.

10.11 Chemical Data Quality Management Plan

See Appendix E, Munitions Constituents Sampling and Analysis Plan for chemical data quality management.